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“A Faustian Bargain?” Public voices on forensic DNA technologies and the national DNA database

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This article draws on the idea of the ‘forensic imaginary’ (Williams 2010) to explore UK public perspectives on the place, role and significance of forensic DNA technologies, both independent of and in relation to other genetic applications. Using correspondents’ replies to the Spring 2006 Mass Observation Directive ‘Genes, Genetics and Cloning’, the analysis focuses on continuities and tensions in their discursive repertoires. The argument examines (a) the ways in which knowledge is made sense of in these accounts, and (b) the discrepancy between an appreciation of the benefits of using DNA identification techniques in police work and a more critical attitude towards a wider national DNA database. The conclusion reflects on the need for a wider scope in research on public understandings of science, which looks beyond targeted consultations and specific publics, and provides more textured data to document collective views on the development and governance of forensic DNA technologies.

Keywords: Mass-Observation, genetics, forensic DNA technologies.

Introduction

Genes, genetics and DNA have come to figure prominently in the ways in which individuals and collectives think about themselves and others (Alper 2002, Hauskeller 2004, Keller 2000, Nelkin and Lindee 1995). Analyses of forensic DNA uses by different collectives evidence that DNA is almost homogeneously perceived as the provider of absolute and irrefutable ‘truth’ (e.g. young offenders - Stackhouse *et al.* 2010; prison inmates - Prainsack and Kitzberger 2009; legal professionals - Dahl 2010; jurors - Ghoshray 2006, Schweitzer and Saks 2007, Tyler 2006). This also applies to the portrayal of DNA in the media (for instance television programs - Brewer and Ley 2010, Ley *et al.* 2010, Kruse 2010; print - Machado and Santos 2011). Whether or not this view of DNA and the ‘CSI effect’² have a tangible impact on wider audiences remains open to debate (Schweitzer and Saks 2007, Tyler 2006). To date, however, few studies discuss how less involved publics make sense of DNA representations and forensic DNA databases. In this article we aim to enrich debates on public views regarding forensic uses of genetics and inform the manner in which future deliberative exercises are conceived, by exploring meanings given to forensic DNA technologies outside targeted consultations and government initiatives.

Williams defines the concept of ‘forensic imaginary’ as “the actual or promised ability increasingly to recover individualisable traces of biological and other materials transferred between persons and objects at crime scenes and to use these traces as evidence to support criminal prosecution”

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² The idea that media representations of DNA (e.g. the television series *CSI: Crime Scene Investigations*) provide unrealistic expectations concerning the potential of forensic technologies and affect jury decisions and legal practices (Cole and Dioso-Villa 2006).

(2010:135). We use this concept to examine replies to the Mass Observation (M-O) Spring 2006 Directive Number 77, Part 1 'Genes, Genetics and Cloning' (hereafter the Directive) and analyze understandings of the place, role and significance of forensic DNA technologies, both independent of and in relation to other uses of genetics. We map continuities and tensions in the appropriation of genetic knowledge and outline the discrepancy between a ubiquitous recognition of the benefits of DNA identification techniques in policing and a more critical attitude to an extended National DNA Database (NDNAD) of England and Wales. We further argue that these data provide hitherto unaccounted for issues regarding genetic knowledge and its uses, together with a rich context to understand better the ways in which such issues are articulated and problems of dis/engagement.

Police DNA databases and public debate

Governing the uses of genetic knowledge has generated extensive academic debate about the scientific, judicial and ethical issues raised in the development and public understanding of DNA-related technologies. Challenging views that forensic databasing would improve crime detection rates and reduce police time spent investigating each crime due to its capacity to both include and exclude suspects in criminal investigations (Schneider *et al.* 1997), studies have highlighted technical issues in the relationship between scientific expertise and judicial decision-making (Jasanoff 1998, Lynch and McNally 2003), the probative difficulties of forensic science evidence in general (Allen and Redmayne 1997, Cole 2001, Redmayne 2001), and the presentation and evaluation of DNA evidence in particular (Edmond 2000, Tracy and Morgan 2000).

Globally several national DNA databases exist at different stages of implementation. While they all share comparable aims, such as deterring crime, aiding its detection and identifying (re)offenders, and raise similar socio-ethical concerns, specific national settings shape how these issues are dealt with (Hindmarsh and Prainsack 2010). The NDNAD was the first police DNA database worldwide. Launched in 1995 and supported by government initiatives and legislative changes, it remains the largest of its kind in the proportion of the population represented, with over 4 million profiles, most of which represent the DNA of persons arrested by the police for recordable offences. The NDNAD also stores crime scene and volunteer samples. However, the recent European Court of Human Rights' *S and Marper v. the United Kingdom* (2008) decision demands changes to database inclusion criteria, and indicates that its expansion will decelerate.

To date, numerous policy issues remain contentious: the application and oversight of the NDNAD, and the type of information derived from DNA profiles (Parliamentary Office of Science and Technology 2006). Some groups support the NDNAD for the public good, as a crime deterrent and tool in the identification of (re)offenders and elimination of the innocent. Others see it as an intrusion, a violation of privacy rights (e.g. in relation to the storage and use of samples) and a mounting infringement on civil liberties. Adding to the ethical problems raised by its actual and potential application, the NDNAD's efficiency and cost-effectiveness are also debated (Williams and Johnson 2004, Van Camp and Dierickx 2007). Instrumental to sustaining stakeholders' and public confidence, the NDNAD's governance framework has to account carefully for the scientific and

police use of the database, and monitor closely emerging juridico-scientific, operational, and ethico-political aspects (Hindmarsh and Prainsack 2010, Rothstein and Talbott 2006, Williams 2010).

Public events and consultations reflect some of these tensions. The Wales 2007 Gene Park and Techniquist public discussion found that 60% of the participants voted in favor of a universal DNA database and indefinite DNA sample retention regardless of whether individuals have been found guilty of an offence (Stackhouse *et al.* 2010). In contrast, the Human Genetics Commission (HGC) Citizens' Inquiry (2008) into the forensic use of DNA and genetic information reported reluctance to such a database and international data-sharing. The Inquiry called for increased transparency in the NDNAD's ownership, governance, and accessibility, along with jury guidance on scientific evidence, better public education through unbiased awareness campaigns, and using different types of evidence in convictions. Along with the extant literature on specific collectives and their perspectives on forensic DNA technologies, such events and consultations offer a valuable insight into public views on DNA-related matters but little indication of the ways in which forensic DNA uses and the NDNAD are understood within a wider genetic context and the broader cultural framing underlying these understandings.

Mass-Observation and the Directive

M-O started as a 'people's anthropology' of life in Britain in 1937, and has become a unique, long-standing enterprise, which since 1981 has used diaries and detailed replies to questions on specific themes to collect information about the lives of ordinary people. Issued three times a year, Directives contain up to three themed sections, to which correspondents, known collectively as the Panel, respond. Correspondents are neither 'the usual suspects' of sociological research on NDNAD: "white, middle-class, articulate individuals who are still at school and typically studying science subjects" (Stackhouse *et al.* 2010: 152), nor do they match the UK demographic profile. With women, older people and southern residents over-represented (Sheridan 1993), generalizations about correspondents' economic status, ethnicity or other demographic variables would be misleading. However, the correspondents' views can be seen as representative in different ways: as individual snapshots of everyday life; indicative of the opinions of a larger number of people; illustrative of the positions of particular groups (e.g. carers, patients, teachers). One of the advantages of M-O resides in its detailed, longitudinal data, which provide social commentary, a collective ethnography and personal testimonies (Bloome *et al.* 1993), offering thus a 'thick description' (Geertz 1973) of everyday life in Britain.

Issued to 522 correspondents, the Directive focused on a series of scientific developments in the field of genetics (**Figure 1**). Of the 204 replies received³, 73 did not mention forensic DNA technologies. Those who did often emphasized other aspects, such as health, which arguably reflects the preoccupations of an elderly Panel. Overall, responses identify the use of DNA in forensics and criminal investigations as the least controversial and most beneficial of genetic applications. In this context, about a third discuss their position regarding the NDNAD and its utility.

³ The response rate was typical of the time: in 2006 it ranged from 39% to 41% with an average of 39.67%. Response rates for this Directive: Part 1 – 'Genes, Genetics and Cloning', 39% (204 replies), Part 2 – 'Public Mourning', 41% (216 replies) and Part 3 – a one-day diary, 40% (211 replies) (Mass Observation Annual Activity Report 28)

In the analysis below, alongside each M-O correspondent's unique identification number we include their gender, age and occupational status to offer a more textured understanding of the data. The testimonies were read, open-coded and then thematically analyzed (Miles and Huberman 1984) independently by two of the authors (DWK and DW) after which themes were compared for consistency. Further collaborative analysis (Strauss 1987) led to the incorporation of different perspectives and increased theoretical sensitivity. The quotes used are representative of the ensuing saturated themes.

Figure 1. Mass Observation Project Spring 2006 Directive Part 1

MO
MASS OBSERVATION
Recording everyday life in Britain

**The Mass Observation Project
Spring 2006 Directive**

As usual, please start all three parts of your reply on a new sheet of paper with your MO number, (NOT name), sex, age, marital status, the town or village where you live and your occupation or former occupation.

Remember not to identify yourself or other people inadvertently within your reply.

Part 1: Genes, Genetics and Cloning

Dolly the sheep, a human ear grown on a mouse, designer babies.....

In 2000 the world heard about the near completion of the Human Genome Map as one of the most important scientific developments of all time. Since then, there have been developments in DNA testing and human cloning. Genetic testing has become widely available, and cures are promised from stem cell research.

Personal experience
We would like to have your thoughts on:

- Genetic testing for inherited conditions
- Paternity testing
- Forensic testing and criminal investigations
- Research purposes

Please tell us about any direct experience that you have had of these scientific developments in the field of genetics. Include experiences of those around you - friends, family, neighbours, work mates and others.

Where do you get your information from on these issues? Please provide as much detail as possible.

Tell us about any films, television programmes, books or artworks that deal with these issues. What do you think of them?

What news coverage, issues or stories about genetics have interested you most, or you have thought most significant?

What do you think about the regulation of scientific research, and how it might impact on you and those around you?

What do you think are the most important issues around human genetics and cloning?

The analysis was based on an understanding of (1) the accounts as polyphonic (Gilbert and Mulkay 1984), illustrating each correspondent's different, sometimes conflicting voices and how these voices interlock and (2) of reading and writing as cultural practices that produce and promote particular social identities. It also included an awareness of our own assumptions, as researchers, regarding the production of the correspondents' accounts and the correspondents' varied reasons for participation.

The accounts display different degrees and ways of engaging with the task. Scholars using M-O data found that correspondents approach Directives in formal or informal styles of writing, and present their answers in confessional, polemical, instructional, or descriptive tones, according to their interest, time, knowledge, and willingness to participate (Bloome *et al.* 2003, Highmore 2002, Hubble 2006, Sheridan 1993). Our findings were similar: from limericks to reflections, from formal essays to informal notes, the testimonies are refreshingly diverse.

Genetic Contexts

Pointing to the continuing need for “awareness and debate about the institutional forms in which scientific knowledge is both presented and created” (Wynne 1991:120), the correspondents’ testimonies illustrate the effort put into acquiring and monitoring scientific information and ascertaining the quality of different sources. TV programs, UK-based or imported, are often identified as providing both information on forensic testing and entertainment. The poetic licenses (for some correspondents) and blatant mistakes (for others) of some of the glossier productions, such as the *CSI* series are discussed: “the investigators go into crime scenes without protective clothing, tossing their hair about and generally corrupting the scene with their own DNA!” (F3137, female, 37, married, researcher). Similarly, while most correspondents report using books and other media as their sources, some express skepticism regarding the information presented:

One area of interaction with these issues that needs to be improved is the ability of journalists to understand and report accurately and without resorting to lurid language. Science generally has made fairly successful attempts to improve the matter of ‘public understanding’, but apart from specialist journals such as *New Scientist* and some [sic] subject specialist journalists working for some [sic] television channels and broadsheet newspapers, there is – as with most other areas of life- a great deal of extremely poor journalism around (H1541, male, 61, retired film editor)

Above, the quality of information available to the public is questioned, identifying the need for the provision of clear knowledge and suggesting a critical engagement with existing resources. This inferred ability to recognize “poor journalism” or inadequate media coverage is stressed further by the line drawn between fact and fiction (although this and other accounts point out that not everyone may be able to distinguish reality from fantasy).

Most often however, a lack of personal experience was invoked by the Panel to explain and reflect on their disinterest in the Directive. Some qualified the lack as odd: “DNA testing is something I’ve had no direct experience of, nor can I think of any friends who have been involved with it. Now I think of it, it seems odd that something that seems to be so widespread has had so little impact on my own life” (H3070, male, 35, charity shop worker). Others explained it at length:

I’m sorry, I’ve tried to write on this topic, and I just can’t. It doesn’t inspire me, and I find I have no strong opinions on genetic testing or the boundaries of scientific research, or any of the other topics mentioned. I don’t seem to care, and I can’t make myself care. I’ve tried to work out why this might be. Perhaps because I’m unlikely to

have children of my own, I don't have much invested in the success of the research enabling other people to have them. Similarly, I don't currently have any kind of medical condition where I am relying on science to make breakthroughs on my behalf (I am sure my attitude would be quite different if I did). Finally, I have concerns about overpopulation and the dwindling of the world's resources, and am therefore able to take a phlegmatic view of some people's inability to reproduce. (B3227, male, 39, university administrator)

If the decision to show an interest in science is social and tied to one's reflection on and ability to act in one's own social environment (Wynne 1991), B3227 and other correspondents demonstrate both detachment from the debate and provide detailed rationales for their disconnection. For B3227 what are seen as mainstream concerns (health and conception), are eclipsed by a lack of relevance to his immediate circumstances, fears of overpopulation and the dwindling of the world's resources. These themes are part of a repertoire of unmanageable risk and ethical questioning which figures in most accounts but is missing in other discussions on the public understandings of genetics:

If cures are found for everything, genes identified for the major conditions, infertility wiped out, children created at the drop of a hat, how would the world cope? I know this is a terrible thing to say, and that if I had a loved one who would benefit from genetic research and development, I would be its biggest advocate (B3185, female 39, homemaker)

Research in genetics has gone too far to be stopped now [...] A few years of scientific meddling could put everything we have become at risk. I would really like to see new research tested over many years – long enough for problems to come to light – before it is released on the human race. (H3459, female 46, home-educator, previously civil servant)

While some correspondents use the Directive to expose their ignorance on genetics matters ("I find this directive to be a little beyond me", B1654, male 74, former editorial manager), others regard it as an incentive to increase one's knowledge through unprompted, independent research, before providing a response ("Thanks to this directive, I know much more about the subject. Now all I need to do is figure out where I need to stand on the moral and ethical debate" A3403, male, 36, unemployed).

Essentially, the testimonies are emblematic of a self-reflexive engagement with the Directive's theme, which gives individuals unlikely to be present in targeted public consultations, the incentive and space to explore and express opinions as they crystallize. In this context knowledge may be less important than taking a stand. Furthermore, such opinions are largely absent from the extant literature, which focuses on specific groups with experience of genetics and forensic DNA technologies. Indifference, lack of knowledge and personal relevance justify some correspondents' disconnection and together with the voicing of different agendas, suggest individualistic tendencies. However, as we show below, despite the absence of personal experience, the majority of the Panel engaged more fully with the Directive.

“DNA as Nemesis”

Given its broad remit, the Directive allows correspondents to situate forensic DNA uses within wider discussions of genetic technologies. They do so unprompted; specific purposes of genetic knowledge are prioritized over others, and placed within a hierarchy of acceptability where forensic DNA practices emerge as “the least contentious application in genetics” (B3019, female 38, civil servant) and “its most successful application” (B1989, male, 79, retired teacher). Accounts highlight the ability to solve cold cases, bring criminals to justice, the deterrent quality of a comprehensive NDNAD and an unbridled enthusiasm for the crime solving potential of forensics:

I am interested in the way that police investigators are reported as having solved cases that are years old, thanks to new development in DNA testing. DNA as Nemesis is a wonderful concept. (R1760, male, 75, retired civil servant)

The ability to revisit ‘cold’ cases, and bring a successful conviction is a great thing... People who commit crimes lose their anonymity I think. Also it would act as a deterrent for most people, or maybe I am just being naive (A3623, male, 47, retired from social care industry)

Imagine how many more crimes would be solved – and incorrectly accused suspects eliminated from enquiries – if everyone’s DNA were on a central database! Forget about human rights issues – there are human responsibilities too (B3019, female 38, civil servant)

Forensic DNA practices are judged in relation to collective concerns for the health of the social body. Whilst acknowledging “human rights issues” and civil liberty concerns, the above accounts prioritize the well-being of society in general over the individual (criminal or otherwise). The forensic imaginary appears here through correspondents’ emphasis on the *potential* uses of forensic technologies, “and the promise of such uses to achieve a reduction in reported crime through increased detections and deterring offenders and other from future criminal activity” (Williams 2010:147-8). However, when discussing a universal database, some correspondents exercise more caution:

I do have a slight issue with the whole DNA database. If convicted of a crime, I think it is fair enough that someone’s DNA should stay on file, but I think if you are acquitted or used as part of an investigation there should be some safeguards. A national DNA database with all of us on it smacks too much of ‘Big Brother’ to me. (A3434, female, 41, retired - UK stock market)

I have heard that the ‘genetic fingerprint’ of each individual is not necessarily completely unique and that several people might fit the same data. If this is the case, then the information would have to be used carefully, and genetic information could not be the sole evidence to convict someone of a crime. It would not be acceptable, it seems to me, to have everyone’s ‘genetic fingerprints’ on police file and then arrest

everyone whose DNA matched the DNA found at a crime scene, regardless of whether those people were feasible suspects in other respects. If this were to happen, then some unfortunate people whose DNA happened to match that of persistent criminals could find themselves repeatedly arrested and harassed, and it would become quite intolerable. (A2212, female, 49, married, author)

Dystopian visions appear to frame the balancing act of protecting the social body versus avoiding an overly surveilled society. Different accounts present this surveillance as good and necessary, or an infringement. Some express ambivalence to contemporary forensic DNA practices, particularly in relation to DNA's discriminatory power as an identification tool and the sole evidence in criminal investigations. Others are concerned about the further expansion of NDNAD: "a Faustian bargain" (C3167, male, 34, warehouse operative). For C3167, genetics "ha[s] the potential to be a force for good, but only if we are vigilant and responsible over how this new knowledge is put to use". Reminiscent of the 'function creep' literature (see Dahl and Sætnan 2009), C3167 infers that the most significant question is one of governing the *potential* of genetic technologies at both the macro level of defining (and establishing) acceptable practice and patrolling use at grassroots levels. Also raised are the need for control mechanisms and questions regarding the oversight of this use:

[I]n order to make such database [sic] work effectively, records would need to be collected of [sic] everyone who lives in/enters the country. As with everything the Government does, it would be very expensive if it were to be set up to cover everyone, and there is an issue of who would have access to the information: the police? Other Government agencies - which ones, customs, security/intelligence, health service? Private organisations, such as health insurance, private health or law firms? Another problem would be that there would be another possibility of a wrongful conviction as there are bound to be some individuals with almost identical DNA to someone else. (A3403, male, 36, single, unemployed)

These governance issues concede that the debate is not just about catching criminals and protecting the social body but safeguarding individuals' data. The forensic imaginary is set within an environment of potential risks and cynicism towards the government. Although some members of the Panel highlight the difference between actual and fictitious notions of DNA as the provider of absolute truth and guaranteed uniqueness, they also infer the potential pitfalls of overzealous acceptance of DNA and DNA evidence in criminal investigations. Other members expand on this by emphasizing the need to educate those involved and streamline the information available:

It is essential that the courts – judges and counsel - are thoroughly familiar with what the evidence presented to them actually means. "Expert" witnesses can give conflicting evidence or interpretations of the same evidence and use of statistics can be confusing to the layman so juries must have the situation very clearly put to them. (B2240, male, 84, retired senior business executive)

The accounts reflect the findings of the HGC Citizen's Inquiry (2008) and add to them through their open discussion of the ethical and practical problems of using DNA in policing. Here, an overriding acceptance of the investigative potential of forensic DNA technologies, and a relegation of civil liberties and human rights to the background due to the immutable benefits of improving the social

body, coexist alongside dystopian visions of the future. DNA appears as a ubiquitous tool for good (in terms of potential police uses) or bad (in terms of 'playing God' and designer babies) but neutrality on this issue (other than statements of ignorance) is avoided.

The strength of the Panel's replies lies in the raising and framing of points and the directness with which issues are questioned. The emphasis on personal experience and the vivid cultural repertoires employed in discussing these issues, enmesh forensic and genetic practices in a textured account of the interface between scientific metaphors and narratives of familiarization with DNA-related technologies. In this context, the use for forensic DNA technologies is justified much in the same way as Prainsack and Kitzberger's (2009) Austrian inmates praise their need.

Throughout the quotations above and the responses in general, the Panel discusses forensic genetics with limited and, at points, inflated vision. Given the media and literature they draw on for information, this may not be surprising. Some, like B2240, acknowledge the lack of the public's forensic knowledge, whereas others signal the divide between the fact and fiction. However, it is left to each correspondent to make sense of or question the information on which they base their responses. Irrespective of the accuracy of their accounts, the correspondents highlight the significance of engaging the public in general on relevant scientific and policy issues such as the NDNAD, and not just those who put themselves forward in dialogue exercises.

Conclusion

What do the correspondents' testimonies tell us about forensic DNA technologies? Collected in 2006, they are arguably outdated with respect to the debate on the addition and retention of profiles on the NDNAD. Moreover, although each question potentially guides correspondents' replies, each Panel member may reply as they wish. Further information or clarity cannot be requested and the length and direction of responses cannot be guaranteed. Alongside issues regarding the lack of representativeness of the sample, M-O data is methodologically difficult to handle (Nettleton and Uprichard 2011), especially in cases of secondary analysis where the purpose of gathering the data in the first place invariably differs from the secondary analysts' own research questions (Heaton, 2004). Yet, while the data may be 'messy' by contemporary research standards (Law 2004), it offers the glimpse of a 'collective autobiography' (Sheridan 1983) and represents an important resource for the exploration of social change (Savage 2010). The accounts provide significant insights into how individuals appropriate information on genetic knowledge in general, forensic DNA technologies in particular and the ways in which such knowledge becomes incorporated into worldviews and contributes to their shaping. Our findings highlight (1) the need for a contextualized understanding of individual worldviews, (2) the correspondents' repertoires of (dis)engagement and (3) the identification of forensic genetics as the least problematic application of genetics.

While deliberative engagement exercises tend to over-simplify individual perspectives (Powell *et al.* 2011, Stackhouse *et al.* 2010), M-O's approach provides a platform to explore themes, articulate opinions in context and engage correspondents in a non-deliberative capacity. The pseudo-authoritative and anonymous position in which the M-O places correspondents appears to empower

them as individual observers of everyday life in Britain, rather than lay publics. Correspondents emerge as active agents, negotiating, investigating and involving themselves in the technological developments and associated debates. They comment critically on topical matters and reflect different voices that may be less eager or able to make themselves heard in other forums.

The accounts provide an interesting snapshot of solicited individual opinions at a specific moment in time and highlight how a widening of inclusion both in terms of the number of topics discussed at one time and the publics encountered, can provide fruitful and insightful information about collective opinions. In particular, this Directive reveals the perceived significance of forensic genetics in contrast to a less enthusiastic reception of genetics in general. This comparative, wider scope that elicits and documents participants' cultural resources and sense-making tools offers a potential future template for gauging publics, which illuminates everyday understandings of genetics in a more nuanced and comprehensive manner.

Not only do the Panel's views add texture to the forensic imaginary (Williams 2010), but they also go to some length to populate a genetic imaginary (Gerlach 2004). When considering both the accounts on unmanageable risk and fears of overpopulation, and those displaying skepticism and undertones of genetic essentialism, it seems that the correspondents' comprehension of genetics appears intrinsically linked to the "habitual images and familiar metaphors" available through lurid media coverage which "provide[s] the cultural forms that make ideas communicable" (Strathern 1992:5). The Panel interpret genetics within these frames of reference, which configure their understanding and sharing of ideas about genetic technologies overall and forensic DNA in particular. Their replies illustrate how cultural resources *act on* the debate by delimiting what each author chooses to include in and/or omit from their accounts. As such, the often noted lack of knowledge of lay publics, criticized extensively by commentators (Michael 1998, Michael and Brown 2005, Powell *et al.* 2011, Wynne 1991), may be interpreted as a self-fulfilling prophecy. Nevertheless, by questioning the quality of information available, acknowledging its limits and suggesting the need for further education, correspondents are demonstrably not cultural dopes.

Clearly delimited parameters of use, good governance and unbiased information have already been highlighted by other analyses of the public understanding of genetics and forensic uses of DNA as issues identified and discussed in various forums (Human Genetics Commission 2008, Stackhouse *et al.* 2010). However, the range of motives and explanations given for the refusal to elaborate on the Directive's topic, are a novel finding and one seldom considered in public engagement exercises and discussions on public understandings of science. Correspondents' testimonies reinforce the need for a more comprehensive documentation of individual strategies of dis/engagement with forensic genetics, their underlying reasons and contexts in which they occur.

Finally, the place given to forensic DNA as the least problematic of genetic applications constitutes our third finding. This was made possible by the thematic breadth of the Directive, which allowed for a greater contextualization of correspondents' conceptions of genetics in everyday life and encouraged the unsolicited hierarchies of acceptability present in the Panel's accounts. In placing the different uses of genetic technologies within an overarching moral and ethical spectrum correspondents show that forensic DNA technologies, which academic literature can often display as problematic, are in comparison, more easily accepted. What the accounts offer is a layered and

multi-vocal approach to forensic DNA technologies and practices observed in a wider genetic context. As such, the Panel's replies constitute an under-explored resource for a better understanding of individual sense-making strategies and collective attitudes. Thus, in relation to the academic debate on the public understandings of science our analysis reinforces the need to fine-tune the ways in which public agendas are approached and addressed.

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